

Pantex High Reliability Organization Implementation

Safety Culture – Taking ISM to the Next Level

26 Aug 2009

ISM Workshop, Knoxville, TN

Richard S. Hartley, Ph.D., P.E.

Steven Erhart, Manager, Pantex Site Office

Greg Meyer, General Manager, B&W Pantex



Pantex, LLC

This presentation was produced under contract number DE-AC04-00AL66620 with



Presenter Bio (Remove before presentation)

- Rick is a principal engineer in the Emergency, Safety, and Health Division at B&W Pantex in Amarillo, Texas.
- Dr. Hartley is currently the primary lead for developing High Reliability Organization (HRO) implementation for Pantex and for implementing an improved Causal Factors Analysis process for organizationally rich, yet non-consequential events.
- Dr. Hartley received his
 - Ph.D. in Nuclear Engineering from the University of Texas at Austin
 - M.S. in Nuclear Weapons Effects from the Air Force Institute of Technology
 - B.S. in Physics from Texas A&M University.
- He holds Professional Engineering Licenses in Environmental Engineering in:
 - Ohio
 - Texas



What is a High Reliability Organization?

- An organization that repeatedly accomplishes its high hazard mission while avoiding catastrophic events, despite significant hazards, dynamic tasks, time constraints, and complex technologies
- Key to becoming an HRO is to learn from your organization's mistakes
 - Pantex Causal Factors Analysis process a key tool to organizational learning

Pantex – A Critical Part of the U.S. Nuclear Deterrent

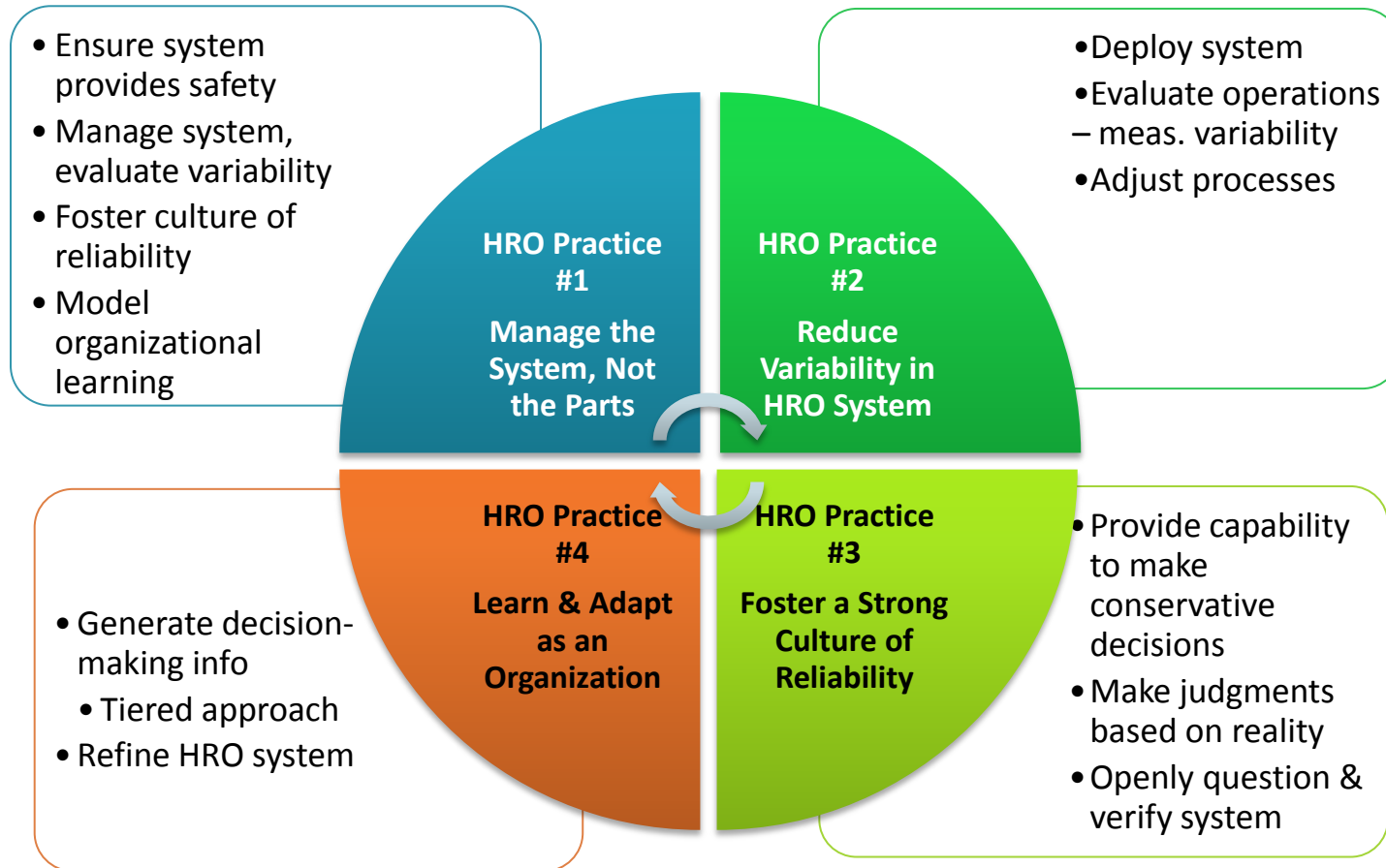
- The U.S. Nuclear Deterrent is Essential
 - Deters threats from weapons of mass destruction
 - Assures our allies of their security
 - Dissuades potential adversaries from threatening U.S. interests
 - Defeats potential adversaries if not deterred
- Value of U.S. Nuclear Deterrent isn't the number of warheads but the credibility of our capabilities in the minds of those we seek to deter, dissuade, or assure
- To achieve its psychological and political objectives, deterrence requires nuclear capabilities to be visible and credible
- Although the DoD delivers the U.S. Nuclear Deterrent
 - The Pantex delivers and protects the weapons
 - Pantex is a essential part of the U.S. Nuclear Deterrent!
 - Pantex has no option except to be an HRO

Pantex – A System Within the Larger Nuclear Deterrent System

- The U.S. Nuclear Deterrent is Essential
 - Deters threats from weapons of mass destruction
 - Assures our allies of their security
 - Dissuades potential adversaries from threatening U.S. interests
 - Defeats potential adversaries if not deterred
- Value of U.S. Nuclear Deterrent isn't the number of warheads but the credibility of our capabilities in the minds of those we seek to deter, dissuade, or assure
- To achieve its psychological and political objectives, deterrence requires nuclear capabilities to be visible and credible
- Although the DoD delivers the U.S. Nuclear Deterrent
 - The Pantex delivers and protects the weapons
 - Pantex is an essential part of the U.S. Nuclear Deterrent!
 - Pantex has no option except to be an HRO

Fundamental HRO Practices

A Systems Approach to Avoid Catastrophic Accidents



Pantex's HRO Journey

(safety culture initiative integrated into HRO efforts)

- **2001 – BEHAVIOR BASED SAFETY**
- **2005 – REINVIGORATED INTEGRATED SAFETY MANAGEMENT**
 - Framework for all safety at Pantex
- **2006 – DEVELOPED FOUNDATION FOR HUMAN PERFORMANCE IMPROVEMENT (HPI)**
- **2007 – EXPLORED HRO & CFA**
 - Senior Managers initiated HRO journey
 - Developed a new Causal Factors Analysis (CFA) Investigation Process
 - Explore **“Information-Rich”** events



Pantex's HRO Journey

(safety culture initiative integrated into HRO efforts)

● 2008 – TESTED HRO & CFA CONCEPTS

- Published HRO and CFA Texts
- Developed HRO and CFA training
- Conducted 8 CFA investigations
- Participated in EFCOG Safety Culture Task Group

● 2009 – HRO IMPLEMENTATION

- Joint DOE/B&W Pantex Plant-wide commitment to improve as an HRO
- Trained managers → safety culture foundation
- Introducing HROs concepts to new hires
- Continue to conduct CFA organizational investigations
- Continue to share HRO process with other DOE and DoD organizations
- Beginning EFCOG Pilot Safety Culture Assessment



Pantex HRO Implementation

- **Joint PXSO & B&W Pantex Top-Down Commitment & Framing**
 - PXSO & B&W Pantex committed to jointly strive, Plant-wide to become an HRO
 - Focus of the HRO - Pinnacle events
- **HRO & CFA Implementation**
 - Continued Education
 - Mentoring
 - HPI integration into HRO
- **HRO Feedback – Organizational Learning**
 - CFA Investigations
 - Assessing Pantex culture of reliability
 - Improving HRO performance indicators
 - Barrier analyses



Pantex HRO Implementation

- **Enhance the HRO - Process Focusing, Leaning, Streamlining**
 - Remove non-value added processes
 - Streamline remaining processes
- **HRO & CFA Communications**
 - Internal
 - External
- **HRO & CFA Applied Research and Development**
 - Benchmarking
 - Continued testing and development within Pantex
 - University collaborations



HRO Practices Improve Safety Culture

ISM Based Safety Culture Focus Areas* (from ISM Principles with Associated Attributes)

HRO Practices (with Associated Actions)

Leadership

- Clear expectations and accountability
- Management engagement and time in field
- Risk informed, conservative decision making
- Open communication/raising issues free from retribution
- Demonstrated safety leadership
- Staff recruitment, selection, retention, & development

HRO Practice #1: Manage the System, Not the Parts

- Leaders ensure the safety system selected, provides safety
- Leaders manage the safety system to reduce variability
- Leaders foster a culture of reliability
- Leaders model organizational learning

Employee/Worker Engagement

- Personal commitment to everyone's safety
- Teamwork and mutual respect
- Participation in work planning and improvement
- Mindful of hazards and controls

HRO Practice #3: Foster a Strong Culture of Reliability

- Enable employees to make conservative decisions
- Ensure proficiency through hands-on training
- Encourage open questioning of, and challenges to, the safety system

Organizational Learning

- Performance monitoring through multiple means
- Use of operational experience
- Trust
- Questioning attitude
- Reporting errors and problems
- Effective resolution of reported problems

HRO Practice #4: Learn and Adapt as an Organization

- Generate decision-making information
- Refine the HRO system: apply a system approach to reduce variability

Work Planning & Control using ISM Core Functions

- Define Scope, ID Hazards, Implement Controls
- Perform Work
- Feedback and Continuous Improvement

HRO Practice #2: Reduce System Variability

- Deploy the Break-the-Chain framework
- Evaluate operation of the safety system
- Systematically adjust processes

* Deputy Secretary Kupfer Memorandum dated January 16, 2009, "Taking Integrated Safety Management to the Next Level: Strengthening Safety Culture"

Pantex's Safety Culture Strategy

(based on IAEA's Approach*)

- **Phase I – Safety Culture Foundation** **2009**
 - Understand concepts of safety culture
 - Understand tools to assess safety culture
 - Understand methods to enhance safety culture
 - Understand methods to continually improve safety culture
 - Obtain practical experience
- **Phase II – Leverage Existing Culture Assessment Tools & Data** **2009**
 - Culture climate survey
 - Manager shop-floor walk-down survey
 - Voluntary Protection Program assessments (VPP)
 - CFA investigations safety culture assessment review
 - Performance Indicators
- **Phase III – Pilot Safety Culture Assessment** **2009 - 2010**
 - Team with Texas A&M industrial psychologists
 - Pilot tools and process in one functional area
- **Phase IV – Baseline Safety Culture Assessment** **2010**
 - Perform Plant safety culture assessment

* "Understanding and Assessing Safety Culture," by Christopher Viktorsson, IAEA

Pantex's Safety Culture Status

● Phase I – Safety Culture Foundation - Training

- HPI** {
 - 100% B&W Pantex Sr. Management (2 ½ day HPI classes)
 - 100% B&W Pantex Managers (8 hour HPI Fundamentals Course)
 - 100% PXSO Managers and Staff (8 hour HPI Fundamentals Course)
 - 100% B&W Pantex workforce (2.5 Hours HPI Introduction)
 - 98 B&W Pantex HPI Investigators (80 hr HPI Fundamentals & Event Investigation)
 - 2 HPI Program Coordinators (Minimum of 80 hours of HPI Training)
- HRO** {
 - HRO Training - Safety Culture fully integrated – published HRO Guide
 - 100% PXSO senior managers (8 hours) – Completed 04/2009
 - 99% B&W Pantex senior managers (8 hours) – As of 08/2009
 - 100% B&W Pantex department managers (8 hours) – Completed 08/2009
 - 100% of PXSO managers and staff (8 hours) – Completed 08/2009
 - 85% B&W Pantex Section Managers and First-Line Supervisors Off-Site (awareness)

● Phase II – Leverage Existing Culture Assessment Tools & Data

- In progress

● Phase III – Pilot Safety Culture Assessment

- In planning

● Phase IV – Baseline Safety Culture Assessment

- TBD

Keys to a Successful High Reliability Organization

- Keep the most important thing, the most important thing
 - Focus on What is Important
 - Measure What is Important
- Daily Tackle the HRO vs. NAT Struggle
- Focus on the Systems Accident, Not Individual Accident
 - Individual safety will also improve
- Adopt a Systems Approach to Avoid Catastrophic Event – TPK
- Implement Systems Approach Using Four HRO Practices
- Strive to Become HRO – Improve Organizational Culture

QUESTIONS?



Want to learn more?

Richard S. Hartley, Ph.D., P.E.

Principal Engineer

806-477-6480

rhartley@pantex.com

B&W Pantex

P.O. Box 30020

Amarillo, TX 79120-0020

Bld 12-6, Rm 126